International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 04 Issue: 12 | Dec -2020 ISSN: 2582-3930

Implementation of Six Sigma in a Electrical Component Manufacturing Firm: A case study

Guruprasad. R[1*], K. Niranjan Rao[2], K. S. Harishanand[3]
[1]*M.Tech. Student, Department of Mechanical Engineering, East Point College of Engineering and Technology, Bengaluru, India*
[2]*Assistant Professor, Department of Mechanical Engineering, East Point College of Engineering and Technology, Bengaluru, India*
[3]*Professor & HoD, Department of Mechanical Engineering, East Point College of Engineering and Technology, Bengaluru, India*

***Abstract*: This paper deals with the implementation of Six Sigma process in a Electrical Component manufacturing company in Bengaluru. The implementation of the Six Sigma improved the entire process and reduced the defects by over 300% and considerable amount of time due to manufacturing defective products was reduced**

***Keywords*: Six Sigma, Defect, DMAIC**

1. Introduction

Six Sigma is usually related to the magic number of 3.4 defects per million opportunities. People often view Six Sigma as yet another rigorous statistical quality control mechanism. Pioneered at Motorola in the mid-1980s, Six Sigma was initially targeted to quantify the defects occurred during manufacturing processes, and to reduce those defects to a very small level. Today Six Sigma is delivering business excellence, higher customer satisfaction, and superior profits by dramatically improving every process in an enterprise in every type of sector. Hence this paper details a case study of the implementation of six sigma in a Electrical Device manufacturing company and the substantial reduction in the defects brought about by the implementation of Six Sigma.

2. Literature Survey

Several articles have been published over a period of time pertaining to the use of Six sigma especially in the small to medium enterprises. The current literature survey refers to three literature review papers published across two decades.

Tjahjono et. al [1] have presented a detailed paper on the research carried out to identify the latest trends, various approaches, tools and techniques, benefits and combinations of Six Sigma with other concepts by carrying out a systematic, thematic literature review. They state that several implementers of Six sigma have clearly indicated that there was substantial reduction in the variability of the process. The authors also stress the need for management involvement and commitment to implement six sigma in their organization.

Sanjeev kumar[2] present a detailed literature review pertaining to the implementation of Six Sigma. Sanjeev Kumar concludes that Six Sigma could be a key strategy for the success of business and need not be treated as just a quality improvement tool. He also indicates that six sigma process improvement. Endeavors to improve both procedure execution and procedure ability.

Ahmad et. al [3] indicate that most of the Fortune 500 companies have adopted it as part of the organizational culture for continuous Enhancing Six Sigma methodology improvement in their processes. The authors put forth that most researchers agree that Six Sigma Methodology focuses on customer requirement, customer satisfaction, cost savings, cycle time reduction and defect prevention.

Table 1
Table title comes here

If you have a Table, simply paste it in the box provided below and adjust the table or the box. If you adjust the box, you can keep the table in single column, if you have long table.

3. Methodology

The methodology used in the current study is similar to the standard procedure used in the implementation of Six sigma for the process involving the manufacture of Surge Counter, a device used to protect transformers against lightning. This is indicated in the figure below

,

Fig. 1. Six Sigma Process

As indicated in the above figure the six sigma process basically involves the Define, Measure, Analyse, Improve and Control phases

UNITS	3000
DEFECTS	300
OPPORTUNITIES	19
DPMO	5263.157
CURRENT SIGMA LEVEL	4

$$DPMO = \frac{\text{Number of Defects X } 10^{\wedge}6}{\text{(No of units X No of opportunities)}}$$

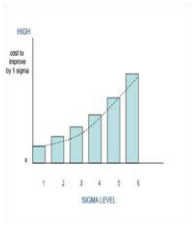
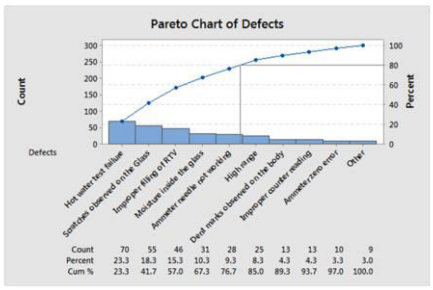


Fig. 2. Current Sigma Level



By considering 80-20 rule, major causes were traced and those will taken for analysis

Fig.3. Pareto Chart indicating the defects

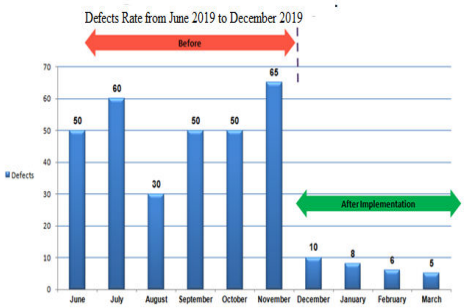


Fig.4. Controlled Defects rate

Figure 1 to Figure 4 indicates the process followed in the implementation of six sigma in a nut shell. The process began by defining the timelines for the implementation of six sigma which was approximately 4 months. The current level of process was found at 4 sigma level, the cause for defects was identified using the Pareto chart. A root cause analysis was done which indicated at the possible remedy for defects identified. It was seen that Operator skills and the time of curing were the potential causes for the defects, and hence the remedial procedures were indicated. Post the improvement and control phase the defects rate were brought down by close to 300 percent.

4. Conclusion

By conducting project on six sigma at the organization, the following objectives were met which are mentioned below,

- As per earlier observed sigma level is 4 and after our project implementation we achieved 5 sigma level.
- The defects were reduced from 300 to 30 per month which increased overall efficiency of the firm.
- A total of 22 Hours and 30 minutes of Rework time per month was saved which led to the production increase of 4 more surge counters per month with the improved quality.
- Greater awareness of six sigma concept was created among employees of the organization.

REFERENCES

[1] B. Tjahjono, P. Ball, V.I. Vitanov, C. Scorzafave, J. Nogueira, J. Calleja, M. Minguet, L. Narasimha, A. Rivas, A. Srivastava, S. Srivastava and A. Yadav ,"Six Sigma: a literature review", International Journal of Lean Six Sigma, vol. 1,no. 3, Issue 3,Aug. 2010

[2] Sanjeev Kumar, "Six Sigma: Literature Review and Implications for Future Research", Research Review International Journal of Multidisciplinary, vol. 4,no. 1,Jan. 2019

[3] A.Ahmed, J. Page and J. Olsen, "Enhancing Six Sigma methodology using simulation techniques Literature review and implications for future research", International Journal of Lean Six Sigma ,vol. 11 ,no. 1, pp. 211-232, Jan. 2020